IN THE CLAIMS

Kindly cancel Group II, claims 20 and 39, Group III, Claims 21-38 and Group IV, Claim 40 without prejudice.

1. (Original) A method of determining, particularly in situ, physical, chemical and/or biological properties or state variables, particularly substance concentrations, temperature, pH and/or physical fields, and/or the change in physical, chemical and/or biological properties or state variables in an examination area of an examination object by determining the change in the spatial distribution of magnetic particles in this examination area or in parts thereof as a function of the effect of, particularly physical, chemical and/or biological, influencing variables on at least a part-area and/or in the, particularly physical, chemical and/or biological, conditions in at least a part-area of the examination area, by means of the following steps:

a) introducing magnetic particles into at least part of the examination area in a first state in which in the examination area or in parts thereof at least some of the magnetic particles that are to be examined are agglomerated and/or coupled to one another in pairs or more, particularly covalently, ionically, coordinatively or via hydrogen bridge bonds or Van der Waals bonds, in particular are at least partially restricted in terms of their freedom of movement, or introducing magnetic particles into at least part of the examination area in a second state in which the particles are deagglomerated and/or decoupled and can be agglomerated and/or coupled,

b) generating a magnetic field with a spatial profile of the magnetic field strength such that there is produced in the examination area a first part-area having a low magnetic field strength and a second part-area having a higher magnetic field strength,

c) changing the, in particular relative, spatial position of the two part-areas in the examination area or changing the magnetic field strength in the first part-area so that the magnetization of the particles is locally changed,

d) detecting signals that depend on the magnetization in the examination area that is influenced by this change, and

e) evaluating the signals so as to obtain information about the change in the spatial distribution of the magnetic particles and/or about physical, chemical and/or biological state variables and/or the change therein in the examination area.

2. (Original) A method as claimed in claim 1, characterized in that at least those state variables in which magnetic particles pass from the first state pass to the second state are detected in an examination area, in particular by the relative arrangement of the magnetic particles changing toward a deagglomeration and/or decoupling and/or by the individual magnetic particles assuming on average a greater distance from one another, or in which the magnetic particles pass from said second state to said first state.

3. (Original) A method as claimed in claim 2, characterized in that the passing of the magnetic particles from the first state to the second state and/or from the second state to the first state takes place thermally, by means of radiation, acid, base, electrical or magnetic fields, ultrasound and/or enzymatically.

4. (Previously Presented) A method as claimed in claim 1, characterized in that the change in the spatial distribution of the magnetic particles that is determined in the examination area is or can be correlated with a local concentration, temperature, pressure, viscosity and/or a local pH value.

5. (Previously Presented) A method as claimed in claim 1, characterized in that according to a first state agglomerated and or coupled-together magnetic particles are in a spatially delimited, solid or viscous medium which can be physically, chemically and/or biologically modified, dissolved and/or degraded.

6. (Original) A method as claimed in claim 5, characterized in that the medium comprises polysaccharides, starch, in particular dextrins or cyclodextrins, waxes, oils, fats or gels.

7. (Original) A method as claimed in claim 5, characterized in that the medium comprises microorganisms, in particular bacteria.

8. (Previously Presented) A method as claimed in claim 1, characterized in that the magnetic particles in the agglomerated or coupled-together state are located in the region of the surface of a particulate, in particular liquid or gaseous, medium.

9. (Previously Presented) A method as claimed in claim 1, characterized in that the magnetic particles become saturated upon application of an external magnetic field, in particular having a strength of about 100 mT or less.

10. (Previously Presented) A method as claimed in claim 1, characterized in that the magnetic particle is a multidomain or monodomain particle the magnetization of which can be reversed by means of Neel's rotation and/or by means of Brown's rotation.

11. (Previously Presented) A method as claimed in claim 1, characterized in that the magnetic particle is a hard- or soft-magnetic multidomain particle.

12. (Previously Presented) A method as claimed in claim 1, characterized in that the magnetic particle is a monodomain particle the magnetization of which is reversed by Neel's and Brown's rotation, or a soft-magnetic multidomain particle of asymmetric shape.

13. (Previously Presented) A method as claimed in claim 1, characterized in that first magnetic particles, bound to at least one functional binding unit, in particular a functional group, a DNA sequence, an RNA sequence and/or an aptamer, and at least second magnetic particles, bound to at least one functional binding unit, in particular a functional group, a DNA sequence, an RNA sequence and/or an aptamer, are present in and/or introduced into the examination area and in that there is present in and/or is introduced into the examination area at least one compound which has at least a first functional binding unit, in particular a functional group, a complementary DNA sequence, a complementary RNA sequence and/or a complementary aptamer sequence, that interacts in a binding manner with at least one functional binding unit of the first magnetic particles and which has at least a second functional binding unit, in particular a functional group, a complementary DNA sequence, a complementary RNA sequence and/or a

complementary aptamer sequence, that interacts in a binding manner with at least one functional binding unit of the second magnetic particles.

14. (Previously Presented) A method as claimed in claim 1, characterized in that the evaluation takes place by means of the following steps:

a) selection of a path for the movement of the first part-area having a low magnetic field strength within the examination area,

b) recording of reference data by means of reference samples along the path according to a) at at least one location, in particular a number of locations, in the case of at least two, in particular a number of, external parameters using at least a first receiving coil,

c) interpolation and/or extrapolation of the reference data recorded in b) in respect of points and external parameters not recorded in step b),

d) measurement of the path within the examination area in a sequence that is identical or substantially identical to that used for the recording of data by means of reference samples according to b) via at least a first and/or second receiving coil, and

e) comparison of the data obtained according to d) with the reference data according to b) and/or c), in particular by means of error square minimization.

15. (Original) A method as claimed in claim 14, characterized in that in a step c') that follows step c), the reference data obtained in steps b) and/or c) are converted to the characteristics of at least a second receiving coil used for the measurement in step d).

16. (Previously Presented) A method as claimed in claim 14, characterized in that in a further step f) the data obtained by means of comparison in step e) are assigned to a gray value for a pixel to give an image, with the relative pixel intensity representing the degree of the determined external parameters.

17. (Original) A method as claimed in claim 16, characterized in that in a further step g) the images obtained in step f) are displayed in a merged image.

18. (Previously Presented) A method as claimed in claim 14, characterized in that the sequence of steps c') to g) or d) to g) is carried out at least twice, in particular a number of times.

19. (Previously Presented) A method as claimed in claim 14, characterized in that the part-area having a low magnetic field strength is moved by actuating and/or moving the coil arrangement or in that in the case of a stationary part-area having a low magnetic field strength the examination object is moved or in that the examination object and the part-area having a low magnetic field strength are moved relative to one another at the same time.

Claims 20 - 40 (Cancel).